Virtual Machine Management for Cloud Data Center to Avoid Security Issues

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Abstract— A cloud computing is one of the emerging field for data transfer through internet. Cloud providers are organizing large-scale data centers athwart the world to meet the Cloud customers' compute, storage, and network resource demands. Efficiency and scalability of these data centers, as well as the recital of the hosted applications' greatly depend on the allotment of the data center resources. In recently, network-aware Virtual Machine (VM) is developing as a very capable technique for the optimization of policy violations, performance degradation and security vulnerabilities. In this paper we provide various technologies to manage the VM to increase the protection from security issues, policy violations.
Key words: Cloud, Virtual Machine, Data Center, Security and Cost Reduction

I. INTRODUCTION

Cloud computing is technology that helps users to have access to huge computing resources. This access is given in the way useful to society. Individuals and organizations can avoid investments and simply use the resources as if they are in their machine. This is done in pay per use fashion. When it comes to virtualization virtual machine is a machine inside the machine which does not exist in the real world. However, it can have its own OS and serve applications of users. Cloud Computing is a recently emerged computing paradigm that promises virtually unlimited compute, communication, and storage resources where customers are provisioned these resources according to their demands following a pay-per-use business model [1]. In order to meet the increasing consumer demands,

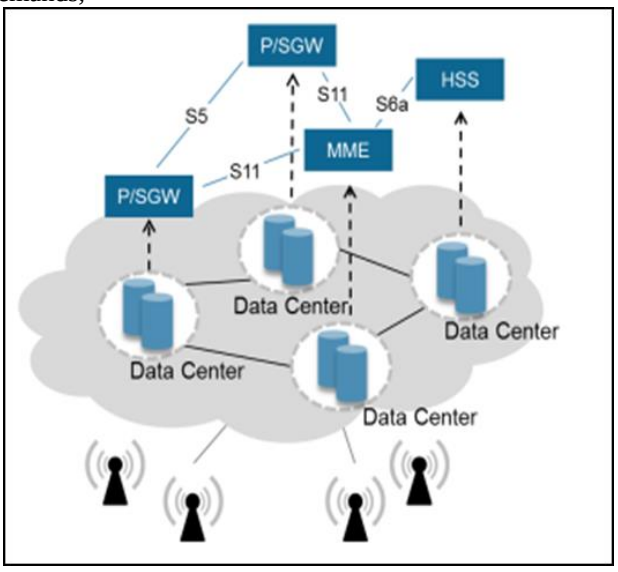

Fig. 1: Cloud Data Center

Cloud providers are deploying large-scale data centers across the world, consisting of hundreds of thousands of servers. Cloud applications deployed in these data centers such as web applications, parallel processing applications, and scientific workflows are primarily composite applications comprised of multiple compute (e.g., Virtual Machines or VMs) and storage components (e.g., storage blocks) that exhibit strong communication correlations among them. Traditional research works on network communication and bandwidth optimization mainly focused on rich connectivity at the edges of the network and dynamic routing protocols to balance the traffic load. With the increasing trend towards more communication intensive applications in the Cloud data centers, the inter-VM network bandwidth consumption is growing rapidly [2]. This situation is aggravated by the sharp rise in the size of the data that are handled, processed, and transferred by the Cloud applications.

Virtual machines provide hardware independence, isolation, and encapsulation. The benefits of virtualization include disaster recovery, training, product evaluations, testing, quality assurance, software development, improved security, decreased provisioning times, server consolidation, increased hardware utilization, and simplified administration. Virtual Machine (VM) is a system which can automatically scale it's infrastructure resources is designed the system composed of a virtual network of virtual machines capable of live migration across multi- domain physical infrastructure Cloud computing services providers deliver their resources based on virtualization to satisfy the need of users [3]. In cloud computing, the amount of resources required can vary preserve request. Since cloud computing services are delivered over the internet there may be undesirable response latency between the users and the database. Hence, for the best recent service, the provider needs to find a data center and physical machine that has a light workload and is geographically close to the users. The fundamental issues, such as provisioning of hosts to VMs, managing application execution, and monitoring dynamic system state, are handled by this layer. A Cloud provider, who wants to study the efficiency of different policies in allocating its hosts to VMs (VM provisioning), would need to implement his strategies at this layer. Such implementation can be done by programmatically extending the core VM provisioning functionality. A Cloud host can be concurrently allocated to a set of VMs that execute applications based on SaaS provider's defined QoS levels. This layer also exposes the functionalities that a Cloud application developer can extend to perform complex workload profiling and application performance study. Clouds exhibit varying demands, supply patterns, system sizes, and resources (hardware, software, and network); users have heterogeneous, dynamic, and competing QoS requirements; and applications have varying performance, workload, and dynamic application scaling requirements. Further, it is tedious and time-consuming to re-configure benchmarking parameters across a massive-scale Cloud computing infrastructure over multiple test runs [4, 5].

Such limitations are caused by the conditions prevailing in the Cloud-based environments and also provide security issues, cost efficiency, etc. for this issue here we provide a various technology to manage the VM to increase the protection from security issues.

II. LITERATURE REVIEW

A. Vijaya -Kumar-C et al [6]

Their development is based on, difficulty data exhaustive applications are increasing in cloud computing. We know that it can reduce investments, human resources and enhance productivity. Data centers play a key role with rapid growth online services of client demands in terms of providing the infrastructures as services (Iaas). For data exhaustive application needs more number of data centers and also massive amount of energy used to operating the servers. Due to increases in data centers in different locations its impact on environment in terms of increased the carbon footprint. We proposed virtual machine migration (VMM) technique to optimize data centers, satisfy performance resource distribution, and reduce the server disappointments and also energy consumption. To reduce the energy consumption, they are proposed virtual machine placement and dynamic load balancing algorithms.

B. Weiwei Fang, et al [7]

assume the demand on online services and cloud computing has kept increasing in recent years, the power customization and cost related with cloud data centers' process have been uprising suggestively. In most existing research work focuses on decreasing power consumption of data centers. Nevertheless, the decisive goal of cloud service operators is to reduce the total processing cost of data centers while guaranteeing the quality of service such as service delay to the end users. From this author work it exploits both the workload transmitting and the service provisioning to address the total electricity cost decreasing problem. This problem is expressed as a categorized capacitated median model based on mixed integer linear programming (MILP) technique. Wide spread assessments based on real-life electricity price data for multiple data centers show the efficiency and efficacy of their approach. The author investigates an emergent and important problem of minimizing the total electricity cost for cloud data centers under a multi-electricity-market environment. We propose a scheme based on the hierarchical capacitated median model to minimize the total electricity cost while guaranteeing the QoS to end users.

C. M. Ramani and Mohammed H. [8]

analyze the Cloud computing offers business-oriented IT resources and IT services delivery as usefulness to users worldwide. The huge rising rate of the practice of large-scale data centers on cloud has request for computational energy. Datacenters presenting cloud applications ingest huge amounts of electrical energy. As a outcome, the cost is supporting by energy consumption and cooling of the data center. It may upturn complete investment on the computing. Therefore, decreasing of energy consumption and stability the temperature of resources are a most important in Cloud Computing. We are working on VM relocation mechanism. The goal is decreasing the energy consumption with thermal aware loadbalancing in a Cloud center. Energy hoards are reached by incessant consolidation of VMs according to current utilization of resources and thermal temperature of computing nodes. In their propose work, they have measured the condition of over-utilization, under-utilization by using resource utilization threshold and control temperature of the host using temperature threshold.

D. Mr. T.Sivakumar and D.Sathish [9]

Cloud computing is one of the emerging field which provide a data on web for accessing the data through web and it is supported by the Internet data center (IDC). A cloud resource encloses effective resources for the user requests. For the users request of data in web, Load balancing and energy consumption is the biggest issue in cloud IDC. It contains the thousands of server to share the data in cloud. In IDC Payment of a data center for energy and cooling may be larger than the overall investment in the computing system. Users of cloud consumed the more energy in both academic and industry. Therefore, minimize energy consumption with balancing the workload of resources is a main credit. For this here proposed the EMCO-IDC (Energy Management& Cost Optimization –IDC) to overcome the issues.

E. Yuan Yao [10]

From this work they focus on a stochastic optimization based approach to make distributed routing and server management decisions in the context of large-scale, geographically dispersed data centers, which suggestions important possible for exploring power cost reductions. Their work reflects such decisions at diverse time scales and offers demonstrable power cost and delay characteristics. The usefulness of their method and its robustness are also illustrated through simulation-based experiments under delay tolerant workloads. Their proposed solution exploits temporal and spatial variations in the workload arrival process (at the front end servers) and the power prices (at the back end clusters) to decreases power cost. It also simplifies a cost vs. delay trade-off which permits data center operators to reduce power cost at the expense of increased service delay. Hence, their work is suited for delay tolerant workloads such as massively parallel and data intensive MapReduce jobs. Today, MapReduce programming based applications are used to build a varied array of web services – e.g., search, data analytics, social networking, etc. Hereafter, even though their proposed solution is more effective for delay tolerant workloads it is still relevant to many current and future cloud computing scenarios.

F. Huang et al. [11]

Have expounded a VM placement problem based on proportional fairness and convex optimization to address the combined problem of reducing energy-consumption and data center traffic volume in order to improve scalability. During the problem formulation, both server-side resource capacity constraints and application-level inter-VM traffic demands are considered. However, given the problem definition, no algorithm or placement mechanism is presented in the work in order to solve the problem. Furthermore, simulation-based evaluation is presented and it is claimed that the combined

VM placement algorithm outperforms random and FFD-based VM placement algorithms.

III. SECURITY AND COST OPTIMIZATION FOR CLOUD DATA CENTER

A. Dynamic Virtual Machine for Cost Optimization

Data centers often provide resources for the peak demand so that they can make sure that sufficient resources are available; in addition, the performance of VMs applications are guaranteed .Needless to say that applications are not always in their peak demand; therefore, physical machines (PMs) are often underutilized since their resources are over provisioned. Studies have found that the average utilization of PMs in many Cloud data centers is very low. Dynamic VM consolidation approaches leverage dynamic nature of Cloud model, both PMs and their VMs are periodically monitored [12]. In order to minimize the number of active PMs and maximize the quality of delivered services, whenever a PM becomes a hot or cold spot, its VMs are reallocated using live VM migration. These kinds of applications are the true beneficiaries of the elasticity property offered by Cloud computing environments. Using elasticity, resources allocated to virtual machines (VMs) based on their application demands, can be dynamically scaled up or down. In fact, after uploading applications onto VMs, the Cloud service provider can properly allocate resources based on demands of applications on VMs. Therefore, users are only charged for what they actually use, reducing their cost significantly.

B. Identity and Access Management for Security

In cloud computing data is stored in distributed location with a many client and run in extraction process with large amount of data of client information. To accessing the data over network may occur an un-trustful problem because of increasing no. of attackers in networks, so who anyone can access our data without our permission which is called hacking process [13]. To control the unauthorized access we provide a mechanism called access control tool, to control the data over distributed networks. Access control works in the bases of authenticate the authorized user with a sigh on mechanisms. It provides a data access matrix to monitor the accessing data limits. Here we provide a mechanism to access the data in limited manner which is controlled by the data user. Identity mechanism is used to find the unauthorized one by sign on of instant user when an actual user is signed in. this mechanism is used to manage the multiple user in a network.

C. Privacy Issue and Data Distribution

A Privacy issue is one of the main issues for the data user who stored their data in the cloud environments. Every user may want their personal data in private manner. Sometimes cloud provider compromise the data to the malicious attackers, so the problem may occur for the data user. With the use of external provider data may loss, so user must make sure who is accessing the data and who is maintaining the server at every time to protect their data. For this privacy issues user can encrypt the data so no one can access the data. Encryption is one of the best methods to protect the data. Encryption is based on embedding the text into some format it may be ciphertext, audio embedding process. Distributed Data mechanism is used to share the data of the user in networks while their roaming when the user need. Data distributed among different locations, need concurrent access of an encrypted data. To preserve data privacy and stability of the user data; we have to eliminate the intermediary server between the user and the cloud provider [14, 15]. Among different providers may taking advantage of secret sharing. Without intermediate server data distribution can done in secure level.

D. Concurrent Independent Access

Concurrently and independently access in a cloud in important one for a cloud database service, protecting data privacy to the user data by allowing a cloud database to perform concurrent operations over an encrypted data, for eliminating a trusted broker or trusted proxy. For this concurrency and independent model Secure Database as a Service (SDBaaS) integrate cloud database with secure provider manner for data Privacy and security. Concurrency model is used to Read/Write operation with the user database in a secure manner. It controlling the data from the unauthorized is one of the main issues for outsourced data in a cloud. Physical control is one of the best methods for the control mechanism and at the same time every time physical control is not a possible one from the unauthorized one. When compare to physical scheme an automatic control mechanism can provide a secure one in the possible of every time [16]. Visualization is one of the important one to control the users data and maintain control over access to user resources. This control mechanism is ability to control the deployed applications and potentially application of the user.

E. VM Selection

If a host is overloaded, then some VMs should be migrated from it. There are four policies to migrate VMs from hosts.

1) Minimum Utilization Policy: The Minimum Utilization Policy (MU) is a simple method to select VMs from overloading hosts. Select the minimum utilization VM to migrate. If it is still overloaded, then repeat the step until the host considered being not overloaded.
2) The Random Choice Policy: The Random Choice Policy (RC) is another simple method to select VMs from overloading hosts. Randomly select a VM to migrate. If it is still overloaded, then repeat the step until the host considered being not overloaded.
3) The Minimum Migration Time Policy: The Minimum Migration Time Policy (MMT) means to migrate a VM, which has the minimum migration time and repeat the step until the host considered being not overloaded. The migration time is estimated as the amount of RAM utilized by the VM divided by the spare network bandwidth available for the host.
4) The Maximum Correlation Policy: The Maximum Correlation Policy (MC) means to migrate a VM on host Li, whose utilization has the maximum correlation coefficient with the sum of the other VMs‟ on host, and

repeat the step until the host considered being not overloaded.

IV. CONCLUSION

Cloud computing is new era of computing utilities which provide utilities as a service like pay as u go model. Because of cloud computing IT services are growing faster and its complexity is reduces Cloud Computing is a recently emerged computing paradigm for unlimited computing resources. Here policy plays an important role for network configure for providing security and high quality performance. Here the problem is allocation of virtual machine faces the security issue and high cost. This provide a Cloud-based environments and also provide security issues, cost efficiency, etc, For solving this issues this paper, we have analyze the optimization of Data Center network resource problems and analyze the variety of policies leading the flows in retreat over the infrastructure and we have presented the various technology to manage the virtual machine for cloud data center for secure transaction.

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